FIG.1

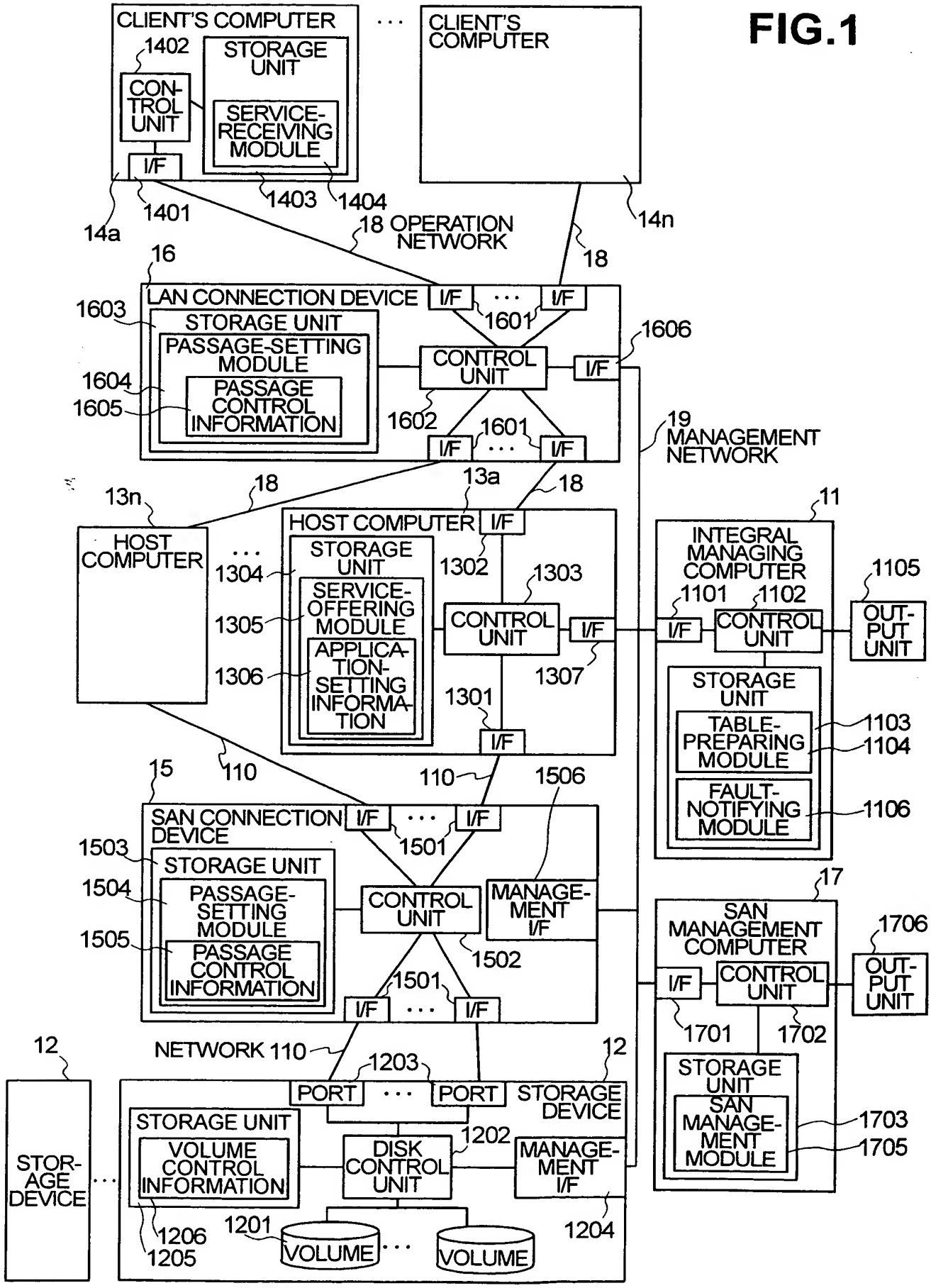

CLIENT'S COMPUTER
CLIENT'S COMPUTER
1402
STORAGE UNIT
CON-TROL UNIT
SERVICE-RECEIVING MODULE
I/F
1401
1403
1404
14a
14n
18 OPERATION NETWORK
18
16
LAN CONNECTION DEVICE
I/F
1601
1606
1603
STORAGE UNIT
PASSAGE-SETTING MODULE
CONTROL UNIT
1604
PASSAGE CONTROL INFORMATION
1605
1602
19 MANAGEMENT NETWORK
13n
18
13a
18
HOST COMPUTER
HOST COMPUTER
1304
STORAGE UNIT
1302
1303
11
INTEGRAL MANAGING COMPUTER
1105
1101
1102
SERVICE-OFFERING MODULE
1305
CONTROL UNIT
OUT-PUT UNIT
APPLICA-TION-SETTING INFORMA-TION
1306
1307
STORAGE UNIT
1301
TABLE-PREPARING MODULE
1103
1104
FAULT-NOTIFYING MODULE
1106
15
110
110
1506
SAN CONNECTION DEVICE
1501
1503
STORAGE UNIT
MANAGE-MENT I/F
1504
PASSAGE-SETTING MODULE
CONTROL UNIT
17
SAN MANAGEMENT COMPUTER
1706
1505
PASSAGE CONTROL INFORMATION
1502
1501
OUT-PUT UNIT
1701
1702
12
NETWORK 110
1203
12
PORT
PORT
STORAGE DEVICE
STORAGE UNIT
STORAGE UNIT
1703
1705
VOLUME CONTROL INFORMATION
1202
DISK CONTROL UNIT
MANAGE-MENT I/F
SAN MANAGE-MENT MODULE
STOR-AGE DEVICE
1206
1205
1201
1204
VOLUME
VOLUME

FIG.2

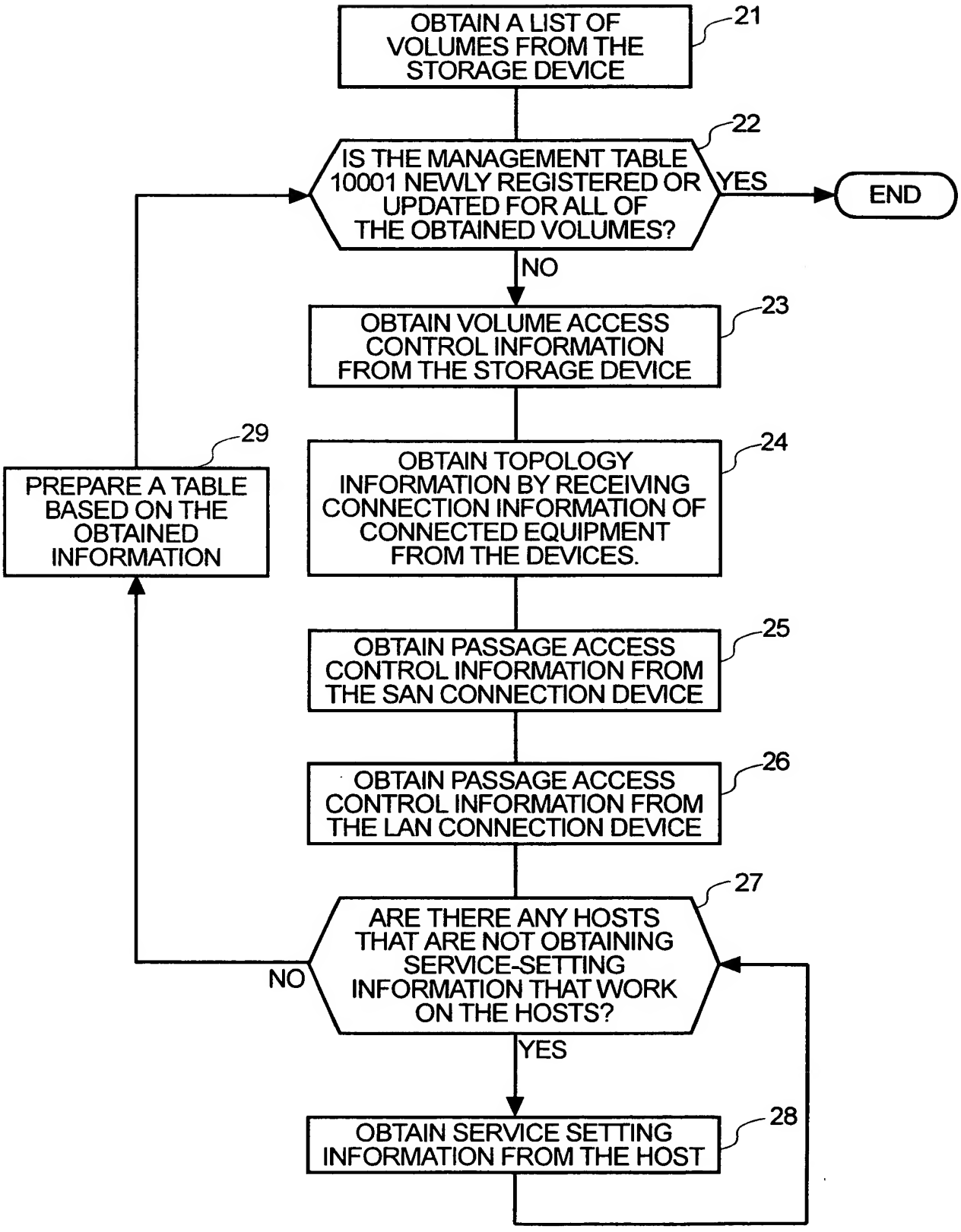

OBTAIN A LIST OF VOLUMES FROM THE STORAGE DEVICE
21
IS THE MANAGEMENT TABLE 10001 NEWLY REGISTERED OR UPDATED FOR ALL OF THE OBTAINED VOLUMES?
22
YES
END
NO
OBTAIN VOLUME ACCESS CONTROL INFORMATION FROM THE STORAGE DEVICE
23
OBTAIN TOPOLOGY INFORMATION BY RECEIVING CONNECTION INFORMATION OF CONNECTED EQUIPMENT FROM THE DEVICES.
24
PREPARE A TABLE BASED ON THE OBTAINED INFORMATION
29
OBTAIN PASSAGE ACCESS CONTROL INFORMATION FROM THE SAN CONNECTION DEVICE
25
OBTAIN PASSAGE ACCESS CONTROL INFORMATION FROM THE LAN CONNECTION DEVICE
26
ARE THERE ANY HOSTS THAT ARE NOT OBTAINING SERVICE-SETTING INFORMATION THAT WORK ON THE HOSTS?
27
NO
YES
OBTAIN SERVICE SETTING INFORMATION FROM THE HOST
28

FIG.3A

VOLUME ACCESS CONTROL INFORMATION

31 NAME OF VOLUME	32 NAME OF HOST
VOLUME 1	HOST A
VOLUME 2	HOST A, HOST B
VOLUME 3	HOST C
.....	.....

FIG.3B

VOLUME STATUS INFORMATION AND PERFORMANCE INFORMATION

31 NAME OF VOLUME	33 STATUS INFORMATION	34 PERFORMANCE INFORMATION (I/O NUMBER/ms)
VOLUME 1	PHYSICAL FAULT	0
VOLUME 2	WRITE INHIBITED	120
VOLUME 3	ACCESSIBLE	350
.....	.....	.....

FIG.4

PHYSICAL CONNECTION INFORMATION

41 NAME OF INTERFACE	42 NAME OF INTERFACE TO BE CONNECTED
00.00.00.00.00.00.00.01	00.00.00.00.00.00.00.04 00.00.00.00.00.00.00.05
00.00.00.00.00.00.00.02	00.00.00.00.00.00.00.06
00.00.00.00.00.00.00.03	00.00.00.00.00.00.00.07 00.00.00.00.00.00.00.08
.....	.....

FIG.5

PASSAGE ACCESS CONTROL INFORMATION

51 NAME OF INTERFACE	52 NAME OF COMMUNICABLE INTERFACE
00.00.00.00.00.00.00.01	00.00.00.00.00.00.00.04
00.00.00.00.00.00.00.02	—
00.00.00.00.00.00.00.03	00.00.00.00.00.00.00.08
.....	.....

FIG.6

APPLICATION-SETTING INFORMATION

61 NAME OF HOST	62 NAME OF SERVICE	63 NAME OF CLIENT	64 NAME OF ACCESSIBLE VOLUME	...
HOST 1	FILE SHARING SERVICE	CLIENT 1, CLIENT 2	LUN 1	.....
HOST 1	WEB INSPECTION SERVICE	CLIENT 2, CLIENT 3	LUN 2, LUN 3	.....
HOST 2	TIME SERVICE	ALL CLIENTS	LUN 4	.....
	.....	.....	.....	.....

FIG.7

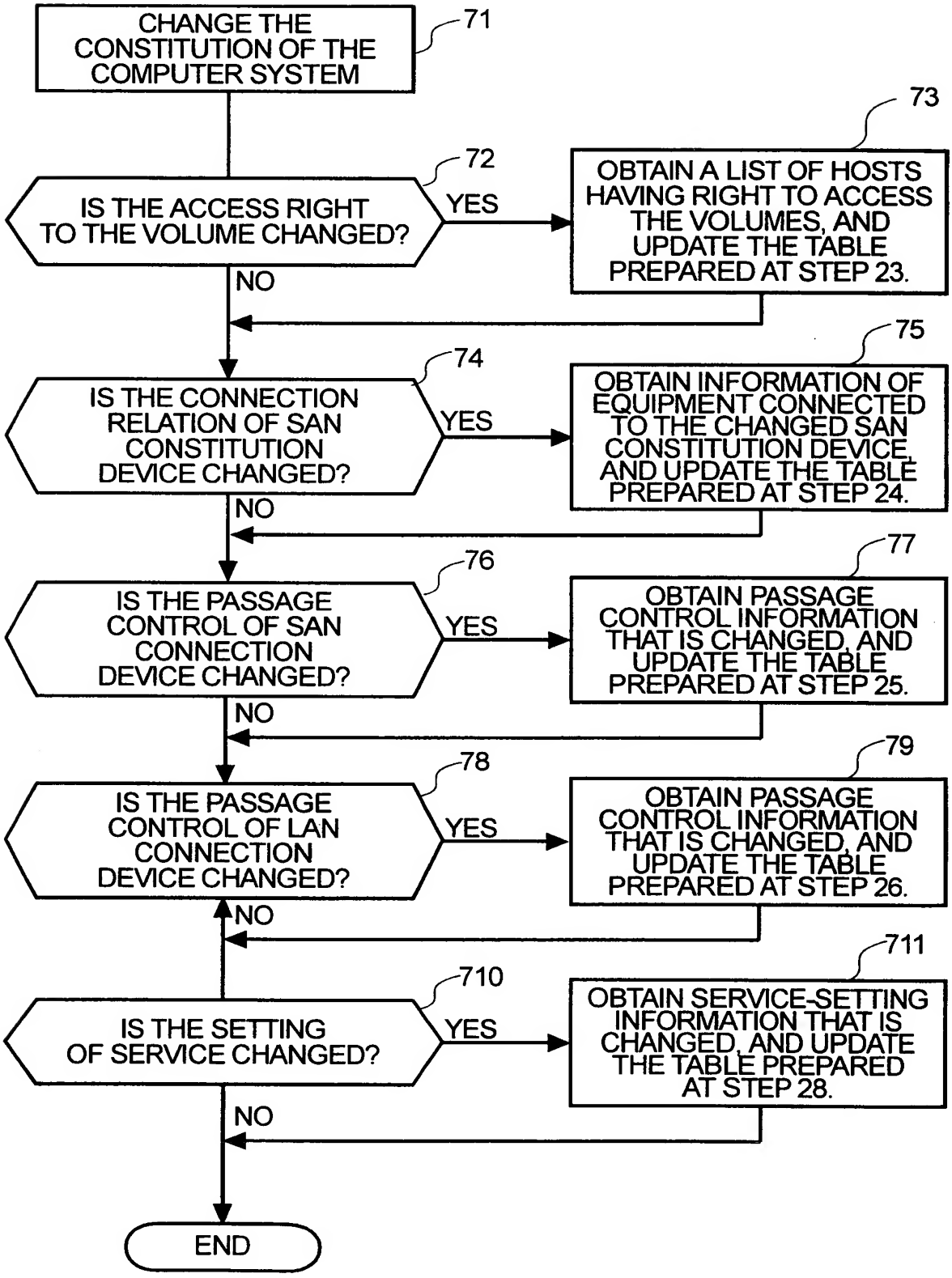

CHANGE THE CONSTITUTION OF THE COMPUTER SYSTEM
71
IS THE ACCESS RIGHT TO THE VOLUME CHANGED?
72
YES
OBTAIN A LIST OF HOSTS HAVING RIGHT TO ACCESS THE VOLUMES, AND UPDATE THE TABLE PREPARED AT STEP 23.
73
NO
IS THE CONNECTION RELATION OF SAN CONSTITUTION DEVICE CHANGED?
74
YES
OBTAIN INFORMATION OF EQUIPMENT CONNECTED TO THE CHANGED SAN CONSTITUTION DEVICE, AND UPDATE THE TABLE PREPARED AT STEP 24.
75
NO
IS THE PASSAGE CONTROL OF SAN CONNECTION DEVICE CHANGED?
76
YES
OBTAIN PASSAGE CONTROL INFORMATION THAT IS CHANGED, AND UPDATE THE TABLE PREPARED AT STEP 25.
77
NO
IS THE PASSAGE CONTROL OF LAN CONNECTION DEVICE CHANGED?
78
YES
OBTAIN PASSAGE CONTROL INFORMATION THAT IS CHANGED, AND UPDATE THE TABLE PREPARED AT STEP 26.
79
NO
IS THE SETTING OF SERVICE CHANGED?
710
YES
OBTAIN SERVICE-SETTING INFORMATION THAT IS CHANGED, AND UPDATE THE TABLE PREPARED AT STEP 28.
711
NO
END

FIG.8

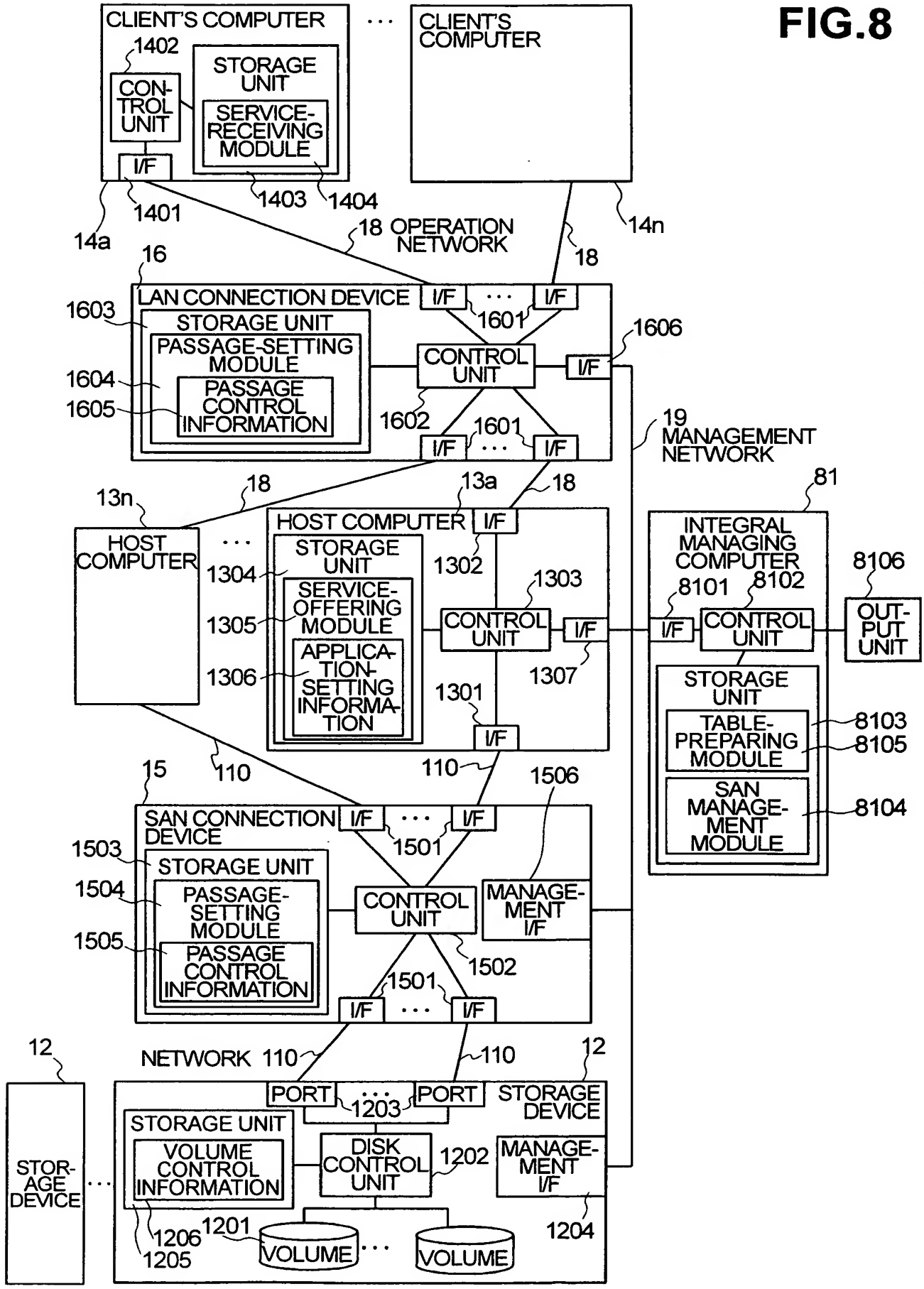

CLIENT'S COMPUTER
CLIENT'S COMPUTER
1402
CON-TROL UNIT
STORAGE UNIT
SERVICE-RECEIVING MODULE
I/F
1401
1403
1404
14a
18 OPERATION NETWORK
18
14n
16
LAN CONNECTION DEVICE
I/F
1601
1603
STORAGE UNIT
PASSAGE-SETTING MODULE
1604
PASSAGE CONTROL INFORMATION
1605
CONTROL UNIT
1606
1602
19 MANAGEMENT NETWORK
13n
18
13a
81
HOST COMPUTER
HOST COMPUTER
STORAGE UNIT
1304
SERVICE-OFFERING MODULE
1305
APPLICA-TION-SETTING INFORMA-TION
1306
1302
1303
CONTROL UNIT
1307
1301
INTEGRAL MANAGING COMPUTER
8101
8102
8106
OUT-PUT UNIT
STORAGE UNIT
TABLE-PREPARING MODULE
8103
8105
SAN MANAGE-MENT MODULE
8104
15
110
1506
SAN CONNECTION DEVICE
1501
1503
STORAGE UNIT
1504
PASSAGE-SETTING MODULE
1505
PASSAGE CONTROL INFORMATION
CONTROL UNIT
MANAGE-MENT I/F
1502
12
NETWORK 110
PORT
1203
STORAGE DEVICE
STORAGE UNIT
VOLUME CONTROL INFORMATION
DISK CONTROL UNIT
1202
MANAGE-MENT I/F
1206
1205
1201
VOLUME
1204
STOR-AGE DEVICE

FIG.9

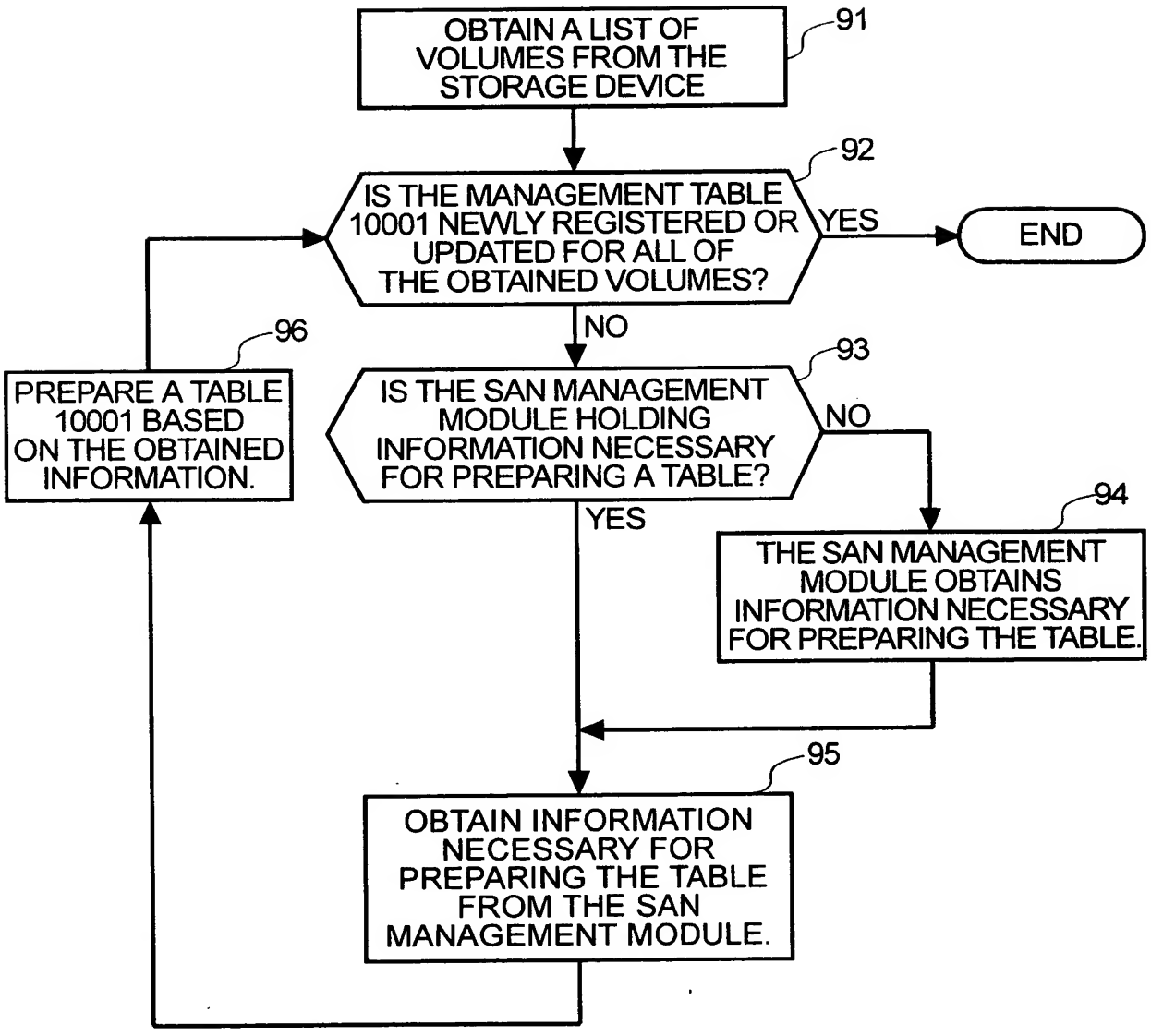

OBTAIN A LIST OF VOLUMES FROM THE STORAGE DEVICE
91
IS THE MANAGEMENT TABLE 10001 NEWLY REGISTERED OR UPDATED FOR ALL OF THE OBTAINED VOLUMES?
92
YES
END
NO
IS THE SAN MANAGEMENT MODULE HOLDING INFORMATION NECESSARY FOR PREPARING A TABLE?
93
NO
YES
THE SAN MANAGEMENT MODULE OBTAINS INFORMATION NECESSARY FOR PREPARING THE TABLE.
94
OBTAIN INFORMATION NECESSARY FOR PREPARING THE TABLE FROM THE SAN MANAGEMENT MODULE.
95
PREPARE A TABLE 10001 BASED ON THE OBTAINED INFORMATION.
96

FIG.10A

MANAGEMENT TABLE

100011 NAME OF CLIENT'S COMPUTER	100012 NAME OF VOLUME USED (LU)	100013 STATUS INFORMATION AND PERFORMANCE INFORMATION OF LU (UTILIZATION PERCENTAGE)	100014 NAME OF HOST COMPUTER OFFERING THE SERVICE	100015 NAME OF SERVICE OPERATING ON HOST COMPUTERS	.....
CLIENT A	VOLUME 1	PHYSICAL FAULT	HOST A	SHARED FILE A	.....
	VOLUME 3	50	HOST A	TIME SERVICE	
	VOLUME 5	PHYSICAL FAULT	HOST B	SHARED FILE B	
CLIENT B	VOLUME 2	PHYSICAL FAULT	HOST A	SHARED FILE A	.....
CLIENT C	VOLUME 4	10	HOST A	TIME SERVICE	
CLIENT D	VOLUME 6	PHYSICAL FAULT	HOST B	SHARED FILE B	
CLIENT E	VOLUME 7	WRITE INHIBITED	HOST B	WEB INSPECTION	
.....	.....	.....	.....	.....	.....

FIG.10B

MANAGEMENT TABLE

NAME OF SERVICE OPERATING ON HOST COMPUTERS	NAME OF VOLUME USED (LVEV)	STATUS INFORMATION AND PERFORMANCE INFORMATION OF LVEV (EMPTY CAPACITY)	NAME OF HOST COMPUTERS OFFERING THE SERVICE	NAME OF VOLUME ON THE HOST TO BE USED	.....
SHARED FILE A	VOLUME 11	PHYSICAL FAULT	HOST A	VOLUME 21	
	VOLUME 11	5	HOST A	VOLUME 21	
SHARED FILE B	VOLUME 11	30	HOST B	VOLUME 23	.....
	VOLUME 11	5	HOST B	VOLUME 23	
TIME SERVICE	VOLUME 12	50	HOST A	VOLUME 22	.....
	VOLUME 13	35	HOST A	VOLUME 22	
WEB INSPECTION	VOLUME 14	WRITE INHIBITED	HOST B	VOLUME 23	
.....	.....	.....	.....	.....	.....

FIG.11

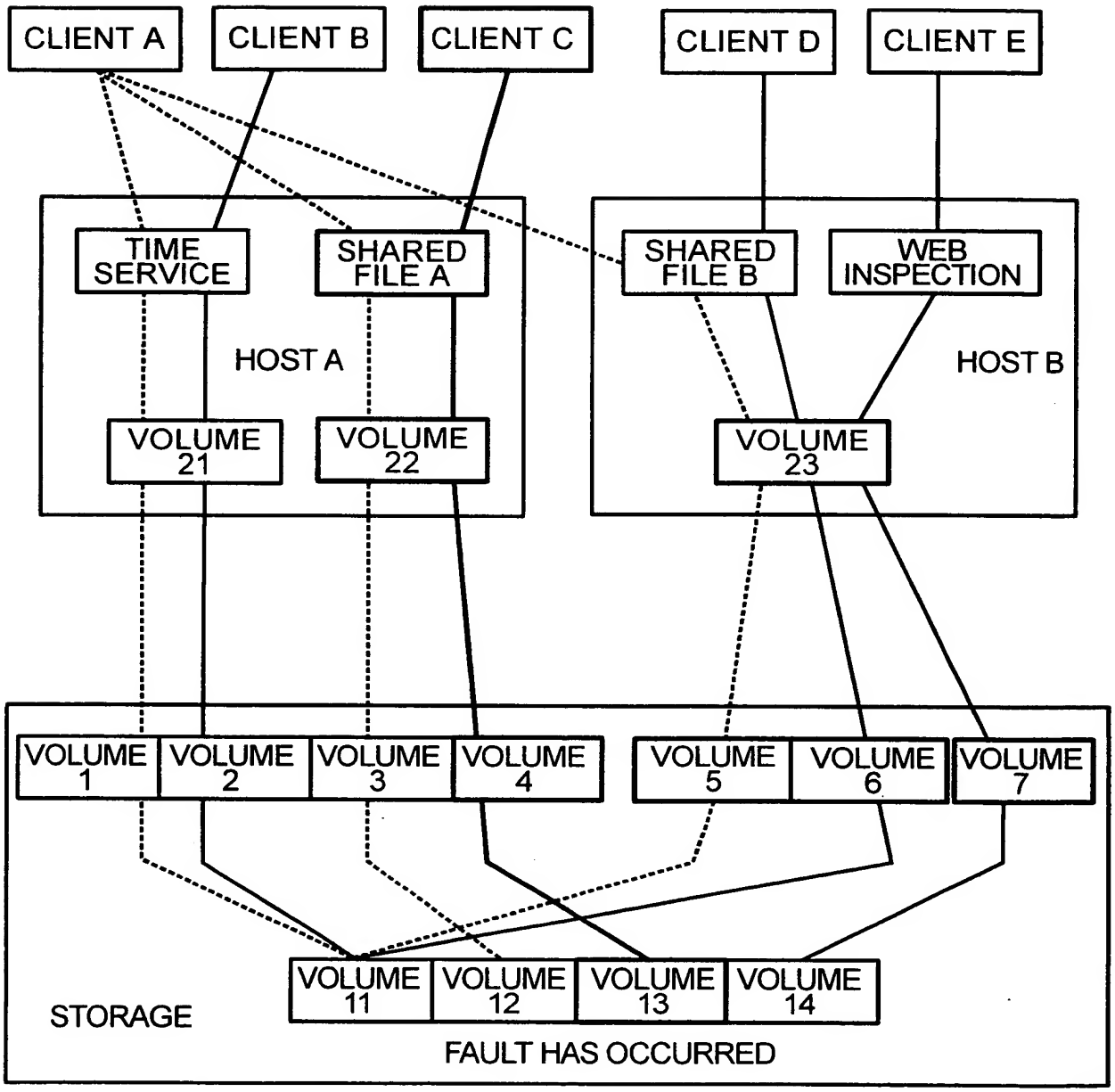
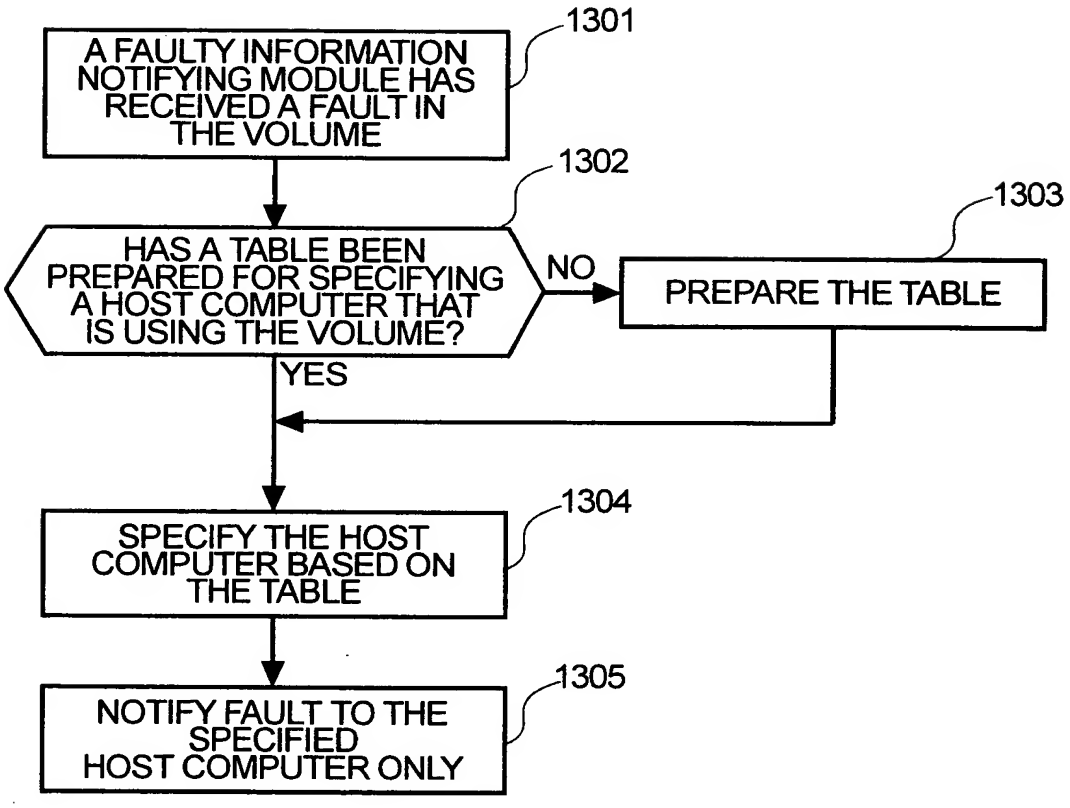

CLIENT A
CLIENT B
CLIENT C
CLIENT D
CLIENT E
TIME SERVICE
SHARED FILE A
SHARED FILE B
WEB INSPECTION
HOST A
HOST B
VOLUME 21
VOLUME 22
VOLUME 23
VOLUME 1
VOLUME 2
VOLUME 3
VOLUME 4
VOLUME 5
VOLUME 6
VOLUME 7
VOLUME 11
VOLUME 12
VOLUME 13
VOLUME 14
STORAGE
FAULT HAS OCCURRED

FIG.12

MANAGING PERSON ACCESS CONTROL INFORMATION

121 MANAGEMENT ID	122 VOLUME THAT CAN BE MANAGED	123 COMPUTER THAT CAN BE MANAGED	...
MANAGING PERSON 1	VOLUME 1, VOLUME 3, ...	HOST 1, CLIENT 1, ...	.....
MANAGING PERSON 2	VOLUME 12, VOLUME 24, ...	SWITCH 1, CLIENT 2, ...	.....
MANAGING PERSON 3	VOLUME 23, ...	ALL CLIENTS	.....
	.....	.....	.....

FIG.13


A FAULTY INFORMATION NOTIFYING MODULE HAS RECEIVED A FAULT IN THE VOLUME
1301
HAS A TABLE BEEN PREPARED FOR SPECIFYING A HOST COMPUTER THAT IS USING THE VOLUME?
1302
NO
PREPARE THE TABLE
1303
YES
SPECIFY THE HOST COMPUTER BASED ON THE TABLE
1304
NOTIFY FAULT TO THE SPECIFIED HOST COMPUTER ONLY
1305